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*Weather*

**WEATHER SUPPORT DOCUMENT**

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This instruction implements Air Force Policy Directive (AFPD) 15-1, *Atmospheric and Space Environmental Support*; Air Force Instruction 15-114, *Weather Support Evaluation*; Air Force Manual (AFMAN) 10-206, *Operational Reporting*, AFMAN 15-111, *Surface Weather Observations*, Air Force Instruction 15-128, *Aerospace Weather Operations--Roles and Responsibilities*; AFMAN 15-129, *Aerospace Weather Operations--Processes and Procedures*, AFMAN 15-135, *Combat Weather Team Operations*; AFOSH STD 91-66, *General Industrial Operations*; and AFOSH STD 91-100, *Aircraft Flight Line – Ground Operations and Activities*, and establishes responsibilities and weather support procedures. It provides general information for weather services, including weather observations and forecasts; weather warnings, watches, and advisories; dissemination of information; and reciprocal support. It applies to units assigned to the 341st Space Wing and subordinate units, and units assigned to, or supported by, Malmstrom Air Force Base. Maintain and dispose of records created as a result of prescribed processes in accordance with AFMAN 37-139, *Records Disposition Schedule*, (will become AFMAN 33-322, Vol. 4).

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## Chapter 1

### GENERAL INFORMATION

**1.1. General .** The Combat Weather Team (CWT), 341st Operations Support Squadron, Weather Flight (341 OSS/OSW), provides weather support to the 341st Space Wing (341 SW) and its units assigned to MAFB. This instruction establishes weather support requirements and procedures outlined by Air Force and Air Force Space Command directives and has been coordinated at the local level to meet mission needs. The CWT will conduct an annual review of this instruction and coordinate changes with the affected customers.

### **1.2. Concept of Operations.**

#### **1.2.1. WEATHER UNITS.**

1.2.1.1. The 25th Operational Weather Squadron (OWS) will produce, disseminate, and amend all forecasts and most Weather Warnings (WW), Weather Watches (WATCH), and Weather Advisories (WA) for MAFB and the missile complex. The OWS will also conduct Meteorological Watch (METWATCH) for the protection of MAFB assets.

1.2.1.2. The CWT will tailor OWS forecasts, when possible, to the specific needs of 341 SW agencies and will provide faxed, electronic, and/or in-person briefings. The CWT will refer requests for information for both on- and off-base events to public affairs to determine whether the request is legal and/or appropriate. The CWT will conduct general METWATCH and Mission Watch (MISSIONWATCH) for 341 SW operations and will serve as the “eyes forward” for the OWS.

1.2.2. DUTY PRIORITIES: The CWT is responsible for supporting all customers located on MAFB and for superseding any OWS weather warnings that the lead forecaster deems necessary. The CWT list of duty priorities is located on [Attachment 2, Table A2.1](#). The OWS is responsible for WWs, WATCHes, and WAs. The OWS list of duty priorities is located on [Attachment 2, Table A2.2](#). The duty forecaster will use good judgment in complying with these priorities, especially where there is imminent danger to life and property.

1.2.3. HOURS OF OPERATION: The CWT will open for operations at 0400L, Monday through Friday. The CWT will close after all 40 HF flights and major maintenance teams return to base for the day. If no flights or major maintenance teams are out after 1630L, the CWT will close. The CWT will open at 0600L on weekends to provide Pre-Departure briefings and will depart at 1000L. The OWS will have a forecaster on-duty at all times.

### **1.3. Operational Support Requirements.**

#### **1.3.1. Supported agencies will:**

1.3.1.1. Establish and coordinate all weather support requirements and procedures with the CWT.

1.3.1.2. Notify the CWT of any changes in weather support requirements.

#### **1.3.2. Unit commanders will:**

1.3.2.1. Ensure they are knowledgeable of critical weather elements affecting their operations.

1.3.2.2. Ensure procedures are established within their organization to adequately respond to disseminated weather information.

1.3.2.3. Review this instruction at least annually for any changes in support requirements and have their supported agency coordinate these changes with the CWT.

## Chapter 2

### WEATHER OBSERVING

**2.1. General .** The official weather observation for MAFB is taken from the Automated Surface Observation System (ASOS) located 250 yards southwest of the base fire station. However, both the CWT and ASOS have several limitations customers must be aware of.

**2.2. CWT Limitations.** The CWT does not have certified weather observers, does not take manual observations, and does not manually augment the ASOS.

**2.3. Meteorological Equipment Locations and Limitations .** Readouts for all meteorological sensors are located at Bldg. 769.

2.3.1. The Remote Automated Weather System (RAWS) is located at the Missile Alert Facilities (MAF) in Bravo, Golf, Oscar, Kilo, and Sierra flights. RAWS provides the only official observations for the 341 SW missile complex (with the exception of ASOS systems in Cut Bank and Lewistown, MT). It can accurately measure wind speed and direction, temperature, dew point, barometric pressure, cloud heights, and liquid precipitation amounts. However, they cannot accurately measure sector visibility, sky conditions throughout the horizon circle, freezing precipitation, lightning, or hail.

2.3.2. A series of Weather Wizard III weather kits are located in the Flight Security Center's (FSC) office at each of the 20 MAFs. These kits are for general weather information only and not considered official observations. The Weather Wizard III kits are not maintained periodically and no established maintenance is provided.

2.3.3. The ASOS system continually senses and displays current weather conditions. The ASOS at Malmstrom AFB is a stand-alone system (not manually augmented). It can accurately measure wind speed and direction, temperature, dew point, altimeter, barometric pressure, cloud heights, current weather conditions (e.g., rain, snow, etc), and liquid precipitation amounts at a single point. However, it cannot accurately measure tornadoes, sector visibility, sky conditions throughout the horizon circle, hail, freezing drizzle, blowing dust, or smoke.

2.3.3.1. Temperature and dew point are measured in Fahrenheit and Celsius. Backup for this sensor is the Kestrel 4000 hand-held weather kit, used at five feet elevation outside Bldg. 769.

2.3.3.2. Wind Speed and Direction. Wind speed is measured in knots. Backup for this sensor is the Kestrel 4000 hand-held weather kit, used at five feet elevation outside of Bldg. 769.

2.3.3.3. Barometric pressure and altimeter setting are measured in millibars and inches respectively. Backup for this sensor is the Kestrel 4000 hand-held weather kit.

2.3.3.4. Visibility is measured in increments of 1/16th of a statute mile (SM), up to 10 SM. As a backup, forecasters can approximate visibility using local predetermined visibility markers.

2.3.3.5. Cloud bases are detected up to 12,000 feet above ground level (AGL). As a backup, forecasters can only roughly approximate cloud bases.

2.3.3.6. Liquid precipitation is measured in increments of 1/100th of an inch

2.3.3.7. Current weather includes rain, rain showers, snow, fog, etc.

2.3.4. The NEXRAD Doppler radar is located one mile south of Great Falls IAP. A Principal User Processor (PUP) Workstation is located in the CWT work center. Limitations include:

2.3.4.1. Range of 150 Nautical Miles (NM) for most radar products and an effective range of about 60 NM for detection of tornadic activity.

2.3.4.2. Mountain ranges from SE-SW-NW block radar returns, resulting in reduced ability to detect precipitation within those areas.

2.3.4.3. There is not an operationally suitable backup for the NEXRAD Doppler radar. The JAAWIN website (<https://afwin.afwa.af.mil/>) offers features similar to that of the PUP, but are generally 20-40 minutes old. It is not sufficient for determining the severity of thunderstorms or identifying hail and tornadoes.

2.3.5. The National Lightning Detection System (NLDN) has no sensors on Malmstrom AFB, but can display lightning strikes anywhere in the CONUS. Limitations include:

2.3.5.1. Only cloud-to-ground lightning strikes are detected by the NLDN.

2.3.5.2. There is no operational backup for the NLDN. JAAWIN offers features similar to that of the NLDN, but are generally 20-40 minutes old.

2.3.6. The CWT operates a Pilot-to-Metro Service (PMSV) radio on the frequency of 239.8 MHz (UHF). It is the primary means of disseminating weather information to airborne aircraft. There is no alternate PMSV service available.

2.3.7. The New-Tactical Forecast System (N-TFS) is used to retrieve and disseminate weather information to and from the OWS or CWT work center. Any computer on the MAFB Local Area Network (LAN) that has the Advanced Meteorological Information System (AMIS) software package installed can retrieve information disseminated via N-TFS. N-TFS refers to system hardware and AMIS refers to system software.

## Chapter 3

### CWT PRODUCTS

**3.1. General.** The OWS routinely issues forecast products for Malmstrom AFB. The products are available on the OWS website for Malmstrom AFB.

**3.2. Limitations .** The OWS and/or CWT will provide forecast support as required by this instruction and/or memorandums of agreement. Forecasting for elements or locations not contained in pertinent directives is neither implied nor should it be inferred.

**3.3. Missions Supported .** The forecast products listed in [Chapter 3](#) and [Chapter 4](#) specifically support personnel and equipment for the following missions:

3.3.1. 341st Operations Group. The 341st Operations Group deploys missile operators, facility managers, chefs, and other OG personnel responsible for the safe operations of 200 ICBMs.

3.3.2. 341st Maintenance Group. The 341st Maintenance Group deploys maintenance teams with cranes, transporter erectors (TE), and Payload Transporter (PT) vans to maintain 200 ICBMs.

3.3.3. 341st Security Forces Group. The 341st Security Forces Group provides law enforcement support for a base population of over 10,000, security for Protection Level 1 resources in the Weapons Storage Area, military working dogs and investigations support. The 341st Security Forces Group also maintains security forces on 24-hour alert providing security for 200 war-postured ICBM's, as well as force protection for ICBM nuclear weapons during on- and off-base movements and during support of ICBM maintenance.

3.3.4. 341st Services Squadron. The 341st Services squadron operates the Malmstrom Outdoor Recreations Pool and Youth Activities Center, both of which require notification of lightning in the area.

3.3.5. 40th Helicopter Flight. The 40th Helicopter flight operates UH-1N Huey helicopters in support of 341st Wing requirements, Search-and-Rescue requests, and flight training requirements.

3.3.6. 341st Logistics Readiness Squadron. The 341<sup>st</sup> Logistics Readiness Squadron provides road condition reports and updates through the Transportation Control Center (TCC).

**3.4. Mission Execution Forecast for Ground Operations .** Mission Execution Forecasts (MEFs) are based on OWS forecasts that are tailored for 341 SW specific missions (missile crew pre-departure, convoy movements, daily major maintenance, etc.). The CWT will provide appropriate MEFs to its 341 SW customers as described below:

**NOTE:** The format and content of the products in section [3.4.1](#). meet the minimum requirement of each customer. Requests from all CWT customers are combined into several PowerPoint slides that may contain more information than a customer needs; however, another customer using the same product may need the information. Minor changes to format and content of these products may be made through electronic or verbal coordination and do not require re-coordination of this instruction.

3.4.1. MEF Format. The CWT produces a 24-hour forecast slide and a 5-day outlook slide for planning purposes. The CWT produces a missile complex forecast slide, a route forecast slide (for specific areas within the missile complex), and a weather hazards slide for specific mission forecasts. The specific data contained on each slide is as follows:



3.4.1.1. The OWS issues a 24-hour, non-amendable aviation forecast for Malmstrom AFB at 0400 L, 1200 L, and 2000 L. Forecasts are valid for the area within 5 statute miles of the 40 HF helipad located near Bldg. 1440 (Bay 5). The CWT tailors the forecast into a plain language forecast to be used by its local customers. Contents of the “Malmstrom Forecast” slide will be in the following order:

3.4.1.1.1. “TIME” - Valid times (Local) for forecast conditions.

3.4.1.1.2. “CLOUDS” - Forecasted sky conditions (Clear, Partly Cloudy, Mostly Cloudy, and Overcast). Mostly Cloudy and Overcast conditions indicate that a ceiling is present.

3.4.1.1.3. “VIS/WX” - Visibility (SM) with weather and obstructions to vision (if any). Obstructions to vision are labeled Rain, Snow, Fog, Freezing Rain, Dust, VCSN (snow in the vicinity), VCRA (rain in the vicinity) or VCTS (thunderstorms in the vicinity).

3.4.1.1.4. “WINDS” - Wind conditions in direction wind is blowing from, measured in knots.

3.4.1.1.5. “ADVISORIES/WATCHES/WARNINGS” - Current weather warnings, watches, and advisories for MAFB and the 341 SW missile complex. NOTE: This slide is only updated twice per day.

3.4.1.1.6. “MAX”, “MIN”, and “WIND CHILL” - Maximum afternoon temperature, minimum overnight temperature, and coldest wind chill factor expected over the next 24-hours.

3.4.1.1.7. “MOONRISE”, “MOONSET”, “SUNRISE”, and “SUNSET” (Local times) and “ILLUMINATION” (percentage of moon’s surface illuminated).

3.4.1.1.8. Temporary groups will be used on this slide to specify intermittent conditions (occurring for 29 minutes or less) and will appear as TEMPO. Temporary groups only specify those conditions expected to be different from the predominate conditions.

3.4.1.2. Contents of the “Extended MAFB Forecast” slide will be in the following order:

3.4.1.2.1. “WX” - Displays icon of predicted weather for the following five days.

3.4.1.2.2. “WIND” - Maximum sustained wind and maximum gust in knots (15-25 indicates 15 knot sustained winds with 25 knot gusts).

3.4.1.2.3. “LOW” - Lowest temperature expected between 0400 L and 0800 L that morning.

3.4.1.2.4. “HIGH” - Highest temperature expected that afternoon.

3.4.1.3. Contents of the “Missile Complex Forecast” slide will be in the following order:

3.4.1.3.1. “Max Wind” - Maximum sustained wind and maximum gust in knots (15-25 indicated 15 knot sustained winds with 25 knot gusts) over the next 36-hours.

3.4.1.3.2. “Max Temp” - Highest temperature expected that afternoon.

3.4.1.3.3. “Min Temp” - Lowest temperature expected that night.

3.4.1.3.4. “Hazards” - Any weather-related hazards expected over the next 36-hours (includes turbulence for helicopter transported crews, fresh snowfall, blowing dust, fog, etc.).

3.4.1.3.5. “Warnings/Watches/Advisories” - Active warnings, watches, and advisories.

3.4.1.3.6. “Sunrise” and “Sunset” - Sunrise and sunset of the current day.

3.4.1.4. Contents of the “Wind Chill / Weather” slide will be in the following order:

3.4.1.4.1. “Day / Night” - Colors represent the coldest wind chills expected over next 36-hours (broken down into daytime and nighttime hours) IAW 20 AF road condition criteria.

3.4.1.4.2. “Weather” - Maximum snowfall accumulation (in inches) expected over next 36-hours.

3.4.1.5. Contents of the “Route Forecast” slide will be in the following order:

3.4.1.5.1. “Current Conditions” - Current sky condition, visibility, and obstructions to visibility as defined in paragraphs [3.4.1.3.1.](#) and [3.4.1.3.2.](#)

3.4.1.5.2. “Forecast Conditions” - Forecast (over next 18-hours) sky condition, visibility, and obstructions to visibility as defined in paragraphs [3.4.1.3.1.](#) and [3.4.1.3.2.](#)

3.4.1.5.3. “Forecast Winds” - Forecast wind speeds (measured in knots).

3.4.1.5.4. “Worst Sky Condition” - Worst (lowest) ceilings (AGL) expected throughout the mission.

3.4.1.5.5. “Visibility” - Worst visibility expected during next 18-hours.

3.4.1.5.6. “Precipitation Accumulation” - Forecasted amount of snow accumulation over next 18-hours.

3.4.1.5.7. 0500 Local MAFB conditions (temperature, winds, and barometric pressure).

3.4.1.5.8. Forecasted maximum and minimum temperature (Fahrenheit) expected along the route.

3.4.1.5.9. Sunrise and sunset (Local).

**3.5. MEF Briefings.** The CWT’s duty forecaster and MEF briefer will work together to prepare quality weather briefings for planning purposes and each day’s individual missions. As of 1 Jan 03, the following briefings are provided:

3.5.1. Pre-Departure Briefing (5 slides). The CWT will provide a MEF for all missile crew departures. The briefing will include:

3.5.1.1. Current satellite.

3.5.1.2. Current weather radar and surface observations from B-01, G-01, O-01, K-01, and S-00 (RAWS) and MAFB (ASOS).

3.5.1.3. Missile Complex Forecast slide ([3.4.1.3.](#)).

3.5.1.4. Wind Chill / Weather slide ([3.4.1.4.](#)) during winter months.

3.5.1.5. Extended MAFB Forecast slide ([3.4.1.2.](#)).

3.5.2. CRF Briefings (Teleconference and PowerPoint (2-3 slides)). The CWT will provide two briefings for all convoy movements.

3.5.2.1. The CWT’s duty forecaster will be included in the teleconference briefing prior to all convoy movements. The duty forecaster will tailor the MEF to the specific route and save the briefing on the S: drive at the following location: *S:\Weather\CRF Briefing*. The briefing will be completed

and available no later than 1 hour prior to the time shown on the convoy-tracking sheet (under “Weather Show Time”). The PowerPoint briefing to security force teams will include:

3.5.2.2. Current satellite.

3.5.2.3. Route Forecast slide (3.4.1.5.)

3.5.2.4. Wind Chill / Weather slide (3.4.1.4.) in winter months only.

3.5.3. Amendments. Any significant changes in observed or forecast conditions expected to affect the convoy movement will be passed on to the command post. This includes, but is not limited to, issuance of a weather warning, watch, or weather advisory.

**3.6. Major Missile Maintenance Briefings.** The CWT will provide the 341 MOS/MXOOJ, Missile Maintenance Operations Center a link to the missile crew “Pre-Departure Briefing” which will include the potential for thunderstorms and lightning within the missile complex.

**3.7. 40 HF Mission Execution Forecast.**

3.7.1. Flight weather packages will be provided to aircrews using the 40 HF flimsy, IAW AFMAN 15-129.

3.7.1.1. The MEF will be prepared and faxed to the Operations Duty Officer (ODO), when required.

3.7.2. Written weather briefings will be prepared using DD Form 175-1, Flight Weather Briefing.

3.7.3. Aircrews will receive verbal briefings upon their request. Verbal weather briefings will be recorded on AF Form 3125, General Purpose (Aircrew Briefing Log [341 OSS/OSW Overprint]).

**3.8. Alternate Forecast Support.** If the evacuation of Building 769 is necessary, the duty forecaster will relocate to the alternate CWT operations site at the 40 HF maintenance center (southeast side of Bldg. 1440 (Bay 5)). CWT support from this location will be limited due to lack of radar and satellite data. Once in place, the forecaster will establish telephone contact with the command post, OWS, and all other wing customers.

## Chapter 4

### WEATHER WARNINGS, WEATHER WATCHES, AND WEATHER ADVISORIES

**4.1. General.** Certain weather conditions endanger property or life, pose a safety hazard, or adversely affect a supported agency's operations. The OWS-CWT team will METWATCH for these conditions and use WWs and WAs to advise supported agencies when these conditions are observed or forecast.

**NOTE:** Only one WW, which may contain more than one WW's criteria, will be in effect at any given time for any one location (i.e., MAFB or the missile complex).

**4.2. Limitations.** Weather observations received from 341 SW field personnel are considered unofficial.

#### **4.3. Weather Warnings, Watches, and Advisories.**

4.3.1. The OWS is the issuing agency for most WWs, WATCHes, and WAs for MAFB and the 341 SW missile complex. The CWT acts as "eyes forward" for the OWS by providing them real-time interpretation of local weather data. When the weather station is closed and upon notification of a WW, WATCH, or WA, the command post will call the CWT's standby forecaster. The standby forecaster will report to the weather station and assess the weather situation for the severe weather events listed in [Table 4.1](#). Table 4.1 shows the following information for each WW, WATCH, and WA:

Name of WW, WATCH, and WA.

4.3.1.1. Criteria (weather conditions) that define each WW, WATCH, and WA.

4.3.1.2. Area (base proper or missile complex) for which the WW, WATCH, or WA is issued.

4.3.1.3. Scale of coverage within the 341 SW missile complex for each WW, WATCH, and WA.

4.3.1.4. Desired Lead-Time (DLT)-Advance notice customers require to react to a WW, WATCH, or WA.

4.3.1.5. 341 SW customer requiring the WW, WATCH, and/or WA.

4.3.1.6. Weather unit (OWS or CWT) responsible for issuing the WW, WATCH, or WA.

4.3.1.7. Additional information about the WW, WATCH, or WA (ex., impact a WW has on its customer).

4.3.2. WWs - The OWS will issue all forecast WWs for MAFB and most forecast WWs for the 341 SW missile complex. The OWS will issue observed lightning warnings for the base after the CWT's normal duty hours. The CWT will issue observed lightning warnings for lightning within five statute miles of base (during normal duty hours) and major maintenance teams. The CWT will issue forecasted WWs for wind gusts exceeding 35 knots in the vicinity of major maintenance teams. The CWT will issue WWs (per [Table 4.1](#).) for 341 MOS specific operations.

4.3.2.1. Severe Weather Action Procedures. Certain WWs (listed in [Table 4.1](#).) require the OWS-CWT team and their affected customers to take specific actions:

4.3.2.1.1. The CWT will open for all severe WWs and WATCHes. During non-duty hours, the command post will receive severe WWs and WATCHes from the 25 OWS and notify the

standby forecaster. The standby forecaster will report to the weather station, contact the OWS, activate the Severe Weather Action Team, and remain open until the event ends.

4.3.2.1.2. The CWT will closely work with on-base and deployed personnel to ensure weather information is disseminated and safety is stressed.

4.3.2.1.3. The CWT will assist the OWS in the METWATCH process; they will act as “eyes forward” for the OWS by providing them with information necessary to issue, justify, and verify any issued WW.

4.3.2.1.4. Unit commanders will maintain and implement pre-SWAP and post-SWAP actions for their respective subordinate units.

4.3.3. WATCHes - The OWS will issue all WATCHes for MAFB and most WATCHes for the 341 SW missile complex. The CWT will issue WATCHes for winds exceeding 35 knots, which affect transporter erector operations. The CWT will issue the above-mentioned WATCHes per [Table 4.1](#), for 341 MOS specific operations only on days where major maintenance or convoy movements are scheduled.

4.3.4. WAs – [Table 4.1](#), identifies the issuing agency for WAs effecting 341 SW customers. WAs are broken down into forecast WAs (FWA) and observed WAs (OWA):

4.3.4.1. FWAs require a lead-time (snow events and icing or turbulence for 40 HF operations).

4.3.4.2. OWAs do not require a lead-time and are issued when a certain weather condition occurs.



Table 4.1. Weather Watch/Warning/Advisory Criteria and Desired Lead Times

Table 4.1 Weather Watch/Warning/Advisory Criteria and Desired Lead Times							
	Criteria	Base Proper / Missile Complex	Scale of Coverage within complex	Lead Time (Minutes)	Requiring Customer	Issuing Agency	Notes
<b>WARNING</b>							
Tornado Warning	Tornado	Both	Squadron	10	All agencies	OWS	Requires CWT SWAP procedures
Severe Thunderstorm	$\geq 3/4$ Inch Hail Level III Winds	Both	Squadron	60	All agencies	OWS	Requires CWT SWAP procedures
Lightning Warning	Observed Lightning within 5 SM	Complex Base	Flight(s) N/A	OB OB	341 MOS 341 SW All agencies	CWT OWS	During CWT hours or major mx / movements During Non-CWT hours
Level I High Wind Warning	Gusts $\geq 35$ Knots	Complex	Flight(s)	60	341 MOS	CWT	During Transporter Erector (TE) operations
Level II High Wind Warning	Sustained Winds $\geq 35$ Knots or Gusts $\geq 45$ Knots	Both	Squadron	60	341 LRS & 341 MOS 741 MSFS 40 HF	OWS	Yellow road conditions, PT van requires waiver Helicopters cannot be started / shut down
Level III High Wind Warning	Sustained Winds $\geq 45$ Knots or Gusts $\geq 52$ Knots	Both	Squadron	60	341 LRS 341 MOS 741 MSFS	OWS	Red road conditions PT van movements require waiver Requires CWT SWAP procedures
Blizzard Warning	Level I Winds / Vis < 1/4 w/ snow	Both	Squadron	90	All agencies	OWS	Requires CWT SWAP procedures
Heavy Snow Warning	Fresh snowfall $\geq 6$ inches	Both	Squadron	90	All agencies	OWS	Requires CWT SWAP procedures
Heavy Rain Warning	Rain $\geq 2$ Inches in 12 Hrs	Both	Squadron	90	All agencies	OWS	
Freezing Precipitation Warning	Freezing rain or drizzle	Both	Squadron	60	All agencies	OWS	Requires CWT SWAP procedures
<b>WATCH</b>							
Tornado Watch	Potential for warning criteria exists	Both	Squadron	120	All agencies	OWS	Requires CWT SWAP procedures
Severe Thunderstorm Watch	Potential for warning criteria exists	Both	Squadron	120	All agencies	OWS	Requires CWT SWAP procedures

Lightning Watch	Potential for warning criteria exists	Both	Squadron	30	341 MOS 341 SW	OWS	
Level I High Wind Watch	Potential for warning criteria exists	Complex	Flight(s)	120	341 MOS	CWT	During Transporter Erector (TE) operations
Level II High Wind Watch	Potential for warning criteria exists	Both	Flight(s)	120	341 LRS & 341 MOS 741 MSFS 40 HF	OWS	
Level III High Wind Watch	Potential for warning criteria exists	Both	Squadron	120	341 LRS 341 MOS 741 MSFS	OWS	Requires CWT SWAP procedures
Blizzard Watch	Potential for warning criteria exists	Both	Squadron	180	All agencies	OWS	Requires CWT SWAP procedures
Heavy Snow Watch	Potential for warning criteria exists	Both	Squadron	180	All agencies	OWS	Requires CWT SWAP procedures
Heavy Rain Watch	Potential for warning criteria exists	Both	Squadron	180	All agencies	OWS	
Freezing Precipitation Watch	Potential for warning criteria exists	Both	Squadron	120	All agencies	OWS	Requires CWT SWAP procedures
<b>ADVISORY</b>							
Snow Advisory	Fresh snowfall $\geq 1/2$ and $< 6$ inches	Both	Squadron	90	341 LRS	OWS	Yellow road conditions
Turbulence Advisory	Forecast $>$ Moderate	Both	Complex	15	40 HF	CWT	40 HF will consider during flight planning
Icing Advisory	Forecast $\geq$ Light	Both	Complex	15	40 HF	CWT	40 HF cannot conduct any missions
Ceiling / Visibility	Cig $< 700'$ / Vis $< 1$ NM	Both	Squadron	OB	40 HF	CWT	40 HF cannot conduct training missions
Ceiling / Visibility	Cig $< 200'$ / Vis $< 1/2$ NM	Both	Squadron	OB	40 HF	CWT	40 HF cannot conduct any missions
Level I Wind Chill Advisory	Wind Chill $< 0$ F	Base Only	N/A	OB	341 SFS	OWS	Ends 341 SFS K-9 searches at main gate
Level II Wind Chill Advisory	Wind Chill $< -40$ F	Both	Complex	OB	341 LRS	OWS	Yellow road conditions
Level III Wind Chill Advisory	Wind Chill $< -65$ F	Both	Complex	OB	341 LRS	OWS	Red road conditions

Note: OB = Observed conditions

## Chapter 5

### DISSEMINATION OF WEATHER WARNINGS, WATCHES, AND ADVISORIES

**5.1. General.** The CWT will assist supported agencies in maintaining an efficient, effective means of disseminating weather support information. Procedures must ensure weather personnel do not spend more time communicating than monitoring weather conditions. All units receiving weather support must be involved in a continuous program of evaluation and improvement of the weather dissemination system, including inter-unit dissemination. Weather dissemination procedures must ensure those who need the information receive it.

#### **5.2. Advanced Meteorological Information System software.**

5.2.1. The primary means of disseminating weather information is via LAN-enabled PCs with the AMIS software package installed. In the event that the base LAN or LAN-to-MAF systems are down, phone dissemination procedures will be used per paragraph 7.2.3. AMIS will be installed at the work centers indicated with an asterisk in [Attachment 3](#).

5.2.2. The N-TFS is used to disseminate the following information to work center PCs with the AMIS software package:

5.2.2.1. MAFB and 341 SW missile complex weather warnings, watches, and advisories. A text example of each is shown on [Attachment 4](#).

5.2.2.2. Pilot reports (PIREPs).

5.2.3. The following applies to all N-TFS transmissions:

5.2.3.1. All wind directions are in degrees magnetic.

5.2.3.2. PIREP cloud heights are MSL.

5.2.3.3. Wind speeds are measured in knots.

5.2.3.4. All times are in UTC unless the time is appended with an "L" in which case it is local time.

5.2.4. Units with AMIS installed on their work center PC must monitor their system for operational status. Each agency experiencing an AMIS outage will report it to the CWT so back up telephone procedures may be initiated (if required) and AMIS account maintenance actions may be taken.

5.2.5. The telephone will be used as a back up for the N-TFS. When the telephone is used, a read-back of disseminated weather information is desired.

#### **5.3. Dissemination for Customers without AMIS Software.**

5.3.1. The Command Post will act as the notifying authority for all customers without AMIS software installed in their work center. Agencies requiring notification that do not have AMIS installed are listed in [Attachment 3](#) under the 341 SW/CP.

**5.4. Backup Product Dissemination Procedures.** In the event of an OWS evacuation or communications outage, WWs, WATCHes, and WAs will be disseminated by the CWT. In the event of a CWT evac-



uation or communications outage, WVs and WATCHes will be issued (by the CWT) via telephone from the alternate weather operations site to the command post.

## Chapter 6

### SPECIAL WEATHER SUPPORT REQUIREMENTS

**6.1. General .** The previous chapters covered support requirements for daily operations on Malmstrom AFB and the 341 SW missile complex. Information on units requiring other weather support is outlined in this chapter. Any special support requirements not covered here, such as routine climatic data for planning purposes, should be coordinated with the weather flight commander.

**6.2. Wing Status Update and Battle Staff Support (341 SW).** The CWT will provide weather support, when required, at all 341 SW “Wing Status Update” and Battle Staff briefings. The CWT will respond to any recall as required by the 341 SW Commander.

6.2.1. Wing Status Update. The CWT will support all “Wing Status Update” briefings, when tasked.

6.2.1.1. The CWT Flight Commander or forecaster will provide a briefing at pre-coordinated times. The briefing will consist of:

6.2.1.1.1. Current Satellite.

6.2.1.1.2. Current radar composite and surface observations from B-01, G-01, O-01, K-01, and S-00 (all RAWS) and MAFB (ASOS).

6.2.1.1.3. “Malmstrom Forecast” slide (3.3.1.1.).

6.2.1.1.4. 24-48 forecast slide for the Eastern Complex, Western Complex, F.E. Warren AFB, Peterson AFB, and Offutt AFB. Slide will show an icon for sky conditions expected the following two days, the evening’s forecast low, and the next day’s forecast high.

6.2.1.1.5. “Extend MAFB Forecast” slide (3.4.1.2.).

6.2.2. Battle Staff Support. The CWT will provide 24-hour battle staff support, when tasked.

6.2.2.1. The CWT will provide weather representatives for 24-hour support to the support battle staff. During times of limited manning, the CWT may need to keep the forecaster at the weather station to provide resource protection of the wing and not physically remain at the command post or alternate command post on a 24-hour battle staff shift. However, the CWT will provide all weather information required by the battle staff. Updated battle staff briefings will be made available in the “Battle Staff” folder on the wing’s S-drive located at: S:\Weather\Battlestaff Slides.

6.2.2.2. The weather representative will provide weather briefings to the battle staff. The briefing will be identical to the “Wing Status Update” briefing. However, the 24-48 hour outlook slide (6.2.1.1.4.) will not be used in battle staff briefings.

6.2.2.3. When requested, a worst-case toxic corridor will be prepared and displayed on the base map in the battle staff. However, the Disaster Control Group (DCG) is responsible for the calculation of the actual toxic corridor.

6.2.2.4. The weather representative will maintain and post a copy of the latest “Downwind Fallout Message” (FUUS22 KGWC and FUUS45 KGWC).

**6.3. Wing Safety (341 SW/SE).** The CWT will provide meteorological data and/or personnel to assist in the investigation of ground, missile, or aircraft mishaps, as required.

**6.4. Job Control (AKIMA/SCAIJ).**

6.4.1. The CWT will notify job control of all communications and support equipment outages, interruptions, and restores. The duty forecaster will open and close all applicable job control numbers regarding meteorological and communications support equipment with job control.

6.4.2. The CWT will assist AKIMA/SCAIJ with any mission impact reports and coordinate scheduled maintenance to minimize the impact on weather operations.

**6.5. Disaster Preparedness Flight (341 CES/CEX).**

6.5.1. The CWT will provide weather data (observations and forecasts) to 341 CES/CEX running Nuclear, Biological, and Chemical (NBC) dispersion models for NBC consequence assessments.

6.5.2. The CWT will provide Effective Downwind Messages (EDM) and Chemical Downwind Messages (CDM) for CONUS AORs.

6.5.3. The CWT, as part of the Disaster Response Force, will provide weather data (observations and forecasts) to 341 CES/CEX when requested.

**6.6. Troop Support and Training Flight (341 OSS/OSOE).** The CWT will provide a CWT operations orientation briefing to all new Facility Managers (FM). The CWT will define procedural instructions to the MAFs for the purpose of missile site weather observations on an annual recurring basis.

**6.7. Helicopter Operations (40 HF).**

6.7.1. The CWT will provide faxed and/or verbal for any search-and-rescue (SAR) mission.

6.7.2. Upon request, the CWT will provide any special operational, climatological, or flight safety briefings.

6.7.3. The CWT will monitor the TACAN system and notify the 40 HF ODO of any outages.

6.7.4. The CWT will notify the 40 HF Flight Information Pamphlet (FLIP) monitor of any changes to the CWT's normal hours of operation or to any changes of the PMSV frequency.

## Chapter 7

### RECIPROCAL SUPPORT

**7.1. General.** The CWT requires reciprocal support from various base agencies. The support requirements are essential to the CWT providing timely and accurate support to MAFB. All reciprocal support units listed will conduct an annual review of this instruction and coordinate changes with the CWT.

**7.2. Command Post (341 SW/CP).** The 341 SW/CP will:

- 7.2.1. Notify the CWT of any wing events or incidents that requires immediate weather support.
- 7.2.2. Disseminate WWs, WATCHes, and WAs to agencies not covered by AMIS ([Attachment 3](#)).
- 7.2.3. Maintain updated copies of the WW, WATCH, and WA checklists used prior to implementation of the AMIS dissemination system to serve as a back-up dissemination system in the event of a LAN outage.
- 7.2.4. Transmit a severe weather OPREP-3 message (as per AFI 10-229 and AFMAN 10-206) and notify the duty forecaster any time reported damage (weather related) occurs to government property.
- 7.2.5. Initiate SWAP by contacting the CWT standby forecaster for any Watch or Warning issued outside of the wing's normal duty hours that is listed in [Table 4.1](#) as "Requires CWT SWAP Procedures".

**7.3. Public Affairs Office (341 SW/PA).** The 341 SW/PA will:

- 7.3.1. Act as a liaison office between the CWT and all nonmilitary agencies or individuals.
- 7.3.2. Receive, process, and forward all valid requests for weather services (forecasts, climatology, lectures, visits, etc.) from nonmilitary sources to the CWT.

**7.4. Protocol Office (341 SW/CCP).** Notify the CWT at least 36 hours in advance of any scheduled DVs to include itinerary.

**7.5. METNAV (341 CS/SCMMM) and JOB CONTROL (AKIMA/SCAIJ).** They will:

- 7.5.1. Maintain a priority listing for restoration of weather equipment. This list will be coordinated between the CWT and 341 CS and incorporated into 341 CS operating instructions (OI). [Attachment 5](#) lists the current equipment and communication restoral priorities listed in the 341 CS OI 21-9. The CWT may alter the priority listing by coordinating with 341 CS if the meteorological situation warrants. Upon notification of a meteorological or communications outage of any type, AKIMA/SCAIJ will take the appropriate maintenance action in accordance with the priority listing. AKIMA/SCAIJ will call the duty forecaster and verify that logged out weather equipment is fixed prior to closing the item.
- 7.5.2. Provide access to the meteorological equipment sensors (ASOS) for the CWT.
- 7.5.3. Provide access to weather equipment operational technical orders for the CWT.
- 7.5.4. Coordinate all scheduled maintenance on ASOS and NEXRAD Doppler radar with the CWT. During periods of inclement weather, equipment will not be taken down for maintenance.

7.5.5. Coordinate all mission impacts for inoperable weather equipment with the duty forecaster.

#### **7.6. Disaster Preparedness (341 CES/CEX).**

7.6.1. The CWT no longer provides toxic corridor Information. If necessary, the CWT's battle staff representative will provide a downwind toxic plume for the battle staff. However, this is only a worst-case scenario for any chemical and is calculated using the current wind speed and direction. 341 CES/CEX and the disaster control group are responsible for determining the actual toxic corridor.

#### **7.7. Power Production (341 CES/CEOIG)**

7.7.1. Coordinate with the duty forecaster prior to performing a routine check of the power generator located in Building 769. This requirement ensures uninterrupted weather support.

#### **7.8. Troop Support and Training Flight (341 OSS/OSOE). OSOE will:**

7.8.1. Annually train facility managers to accomplish surface weather observations (10 MS, 12 MS, 490 MS, and 564 MS) in accordance with OSOE operating instructions, to include the reporting of special weather criteria as determined by the CWT. With the CWT, coordinate a lesson plan that includes:

7.8.1.1. Revisions of all operating instructions dealing with weather observations.

7.8.1.2. Training facility managers to evaluate/report weather elements (when necessary) to the CWT.

7.8.1.3. Train facility managers to contact the CWT when running generator tests that affect RAWS.

7.8.2. Annually coordinate training requirements for initial FM weather orientation training with the CWT.

#### **7.9. Helicopter Operations (40 HF). The 40 HF will:**

7.9.1. Engage in Cooperative Weather Watch by providing PIREPS of any significant or unexpected weather encountered in flight, via PMSV, or debrief to CWT.

7.9.1.1. Engage in Cooperative Weather Watch by providing PIREPs during climb-out and descent when low-level hazards are forecast (verifying the occurrence or non-occurrence of the forecast hazard).

7.9.2. Coordinate and provide time during flying safety meetings for weather presentations on selected subjects.

7.9.3. Contact the CWT via the PMSV frequency to serve as a communications check.

7.9.4. Contact 341 CS METNAV section during TACAN outages.

7.9.5. Coordinate with the National Imagery and Mapping Agency (NIMA – DoD) to ensure any changes to the CWT's normal operating hours and changes to the PMSV frequency are implemented into DoD FLIPs.

**7.10. Maintenance Plans Section (341 MOS/MXOOS).** The 341 MOS/MXOOS will notify the CWT of scheduled high profile vehicle movements and major maintenance in the missile complex. This will be done the day prior to scheduled movements. Unscheduled, same day movements will be coordinated by the Missile Maintenance Operations Center.

**7.11. Transportation Control Center (341 LRS).** The TCC will assist the CWT through the Cooperative Weather Watch process. To do this, the TCC will provide an overall picture of the road conditions in the missile complex through the GPS homepage (updated whenever road conditions change).

C. DONALD ALSTON, Colonel, USAF  
Commander

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****Abbreviations and Acronyms***

**AFTOX**—Air Force Toxic Chemical Dispersion Model  
**AFWA**—Air Force Weather Agency (Offutt AFB NE)  
**AGL**—Above Ground Level  
**AMIS**—Advanced Meteorological Information System  
**ASOS**—Automated Surface Observing System  
**CWT**—Combat Weather Team  
**C**—Degrees Celsius  
**DLT**—Desired Lead Time  
**F**—Degrees Fahrenheit  
**FAA**—Federal Aviation Administration  
**FCST**—Forecast  
**FLIP**—Flight Information Publication  
**Hg**—Atomic Symbol for Mercury  
**JAAWIN**—Joint Army-Air Force Weather Information Network  
**LLWS**—Low Level Wind Shear  
**MAF**—Missile Alert Facility  
**METWATCH**—Meteorological Watch  
**MISSIONWATCH**—Mission Watch  
**MHz**—Megahertz (unit for the measurement of frequency)  
**MOS**—Manual Observing System  
**MSL**—Mean Sea Level (height above the average sea level)  
**NEXRAD**—Next Generation Weather Radar (Doppler radar)  
**NLDN**—National Lightning Detection Network  
**NM**—Nautical Mile (Unit for measuring distance)  
**NOTAM**—Notice to Airman  
**N-TFS**—New Tactical Forecast System  
**NWS**—National Weather Service (Department of Commerce)  
**OWS**—25th Operational Weather Squadron (Davis-Monthan AFB, AZ)  
**PIREP**—Pilot Report

**PMSV**—Pilot-to-Metro Service

**RAWS**—Remote Automated Weather System

**SWAP**—Severe Weather Action Procedures

**SWAT**—Severe Weather Action Team

**TEMPO**—Temporary Conditions

**WA**—Weather Advisory

**WATCH**—Weather Watch

**WW**—Weather Warning

**VC**—Vicinity (between 5 and 10 SM from the helipad located near Bldg. 144)

### ***Terms***

**Ceiling**—the height of the lowest broken (mostly cloudy) or overcast (cloudy) layer, when combined with coverage below it.

**Celsius**—a metric unit used to measure temperature.

**Cloudy**—Cumulative sky condition is 8/8 covered with clouds (Overcast in aviation format).

**Cooperative Weather Watch**—Cooperation between the Combat Weather Team, 40 HF, TCC, and personnel deployed in the missile field to ensure critical weather data is passed to the weather agencies.

**Desired Lead-time**—the amount of advance notice a supported agency needs to react to an advisory or warning (within the limits of state-of-the-art forecast capabilities).

**Eyes Forward**—Refers to CWT's responsibility to provide real-time weather observations to the OWS (The CWT will act as the "eyes forward" for providing the OWS with conditions at Malmstrom AFB.)

**Fahrenheit**—an English Standard unit to measure temperature.

**Forecast Weather Advisory (FWA)**—An advisory issued when critical weather conditions are forecast to occur. It's accompanied by a valid time and a desired lead-time.

**Meteorological Watch**—The process of the 25th Operational Weather Squadron monitoring the Montana weather. The purpose of a METWATCH is to identify when and where observed conditions are different from forecast conditions so the forecast product can be amended and designated agencies notified.

**Mission Watch**—The process of the Combat Weather Team monitoring the weather for a specific mission. The purpose of a MISSIONWATCH is to identify and alert 341 SW customers to changes in the Mission Execution Forecast or provide a new MEF because of changes to the mission itself.

**Mostly Cloudy**—Cumulative sky condition is 4/8 to 7/8 covered with clouds (Broken in aviation format).

**Mostly Sunny**—Cumulative sky condition is 1/8 covered with clouds (Few in aviation format).

**Observed Weather Advisory (OWA)**—an advisory issued when critical weather conditions are observed to occur. No valid times or desired lead times accompany this advisory.

**Partly Cloudy**—Cumulative sky condition is 2/8 to 3/8 covered with clouds (Scattered in aviation format).



**Pilot-to-Metro Service (PMSV)**—a two-way radio service used for exchange of weather information between the Combat Weather Team and aircraft.

**Severe Thunderstorm**—a thunderstorm with 50 knot wind or greater and/or  $\frac{3}{4}$  inch hail, or greater.

**Sunny**—Cumulative sky condition is 0/8 covered with clouds (Sky Clear in aviation format).

**Weather Advisory**—a special notice provided to a supported agency when an established weather condition that could affect its operation is occurring or is expected to occur.

**Weather Warning**—a special notice provided to a supported agency when an established weather condition of such intensity as to pose a hazard to property or life is occurring or is expected to occur. A weather warning is issued for situations that require the supported agency to take protective action.

**Weather Watch**—a special notice provided to customers to alert them that atmospheric conditions are favorable for the development of severe weather. Watches will be upgraded to warnings if severe weather activity appears imminent.

**Zulu**—a system of time, also known as Greenwich Mean Time or Universal Time Coordinate.

**Attachment 2****25 OWS AND 341 OSS/OSW (CWT) LIST OF DUTY PRIORITIES****CWT Duty Priority List****Table A2.1. CWT DUTY PRIORITIES**

Priority	Duties
1	Perform Emergency War Order Taskings
2	Respond to Aircraft/Ground Emergencies
3	Provide Products and Services in Support of Combat, Contingency, & Military Operations Other Than War
4	Provide Airborne Aircrew Support (Phone Patch)
5	Provide Resource Protection (Forecast Weather Watches, Warnings and Advisories)
6	Disseminate UUA Pilot Reports
7	Provide Scheduled Flight Weather MEFs and Tactical-level, Non-Contingency MEFs (175-1, Flimsies, Pre-Departure, Combat Readiness Forces, etc.)
8	Provide Aerospace Weather Products, Information and Weather Briefings (Climatology, Plain Language Requests)
9	Accomplish Other Routine Weather Support

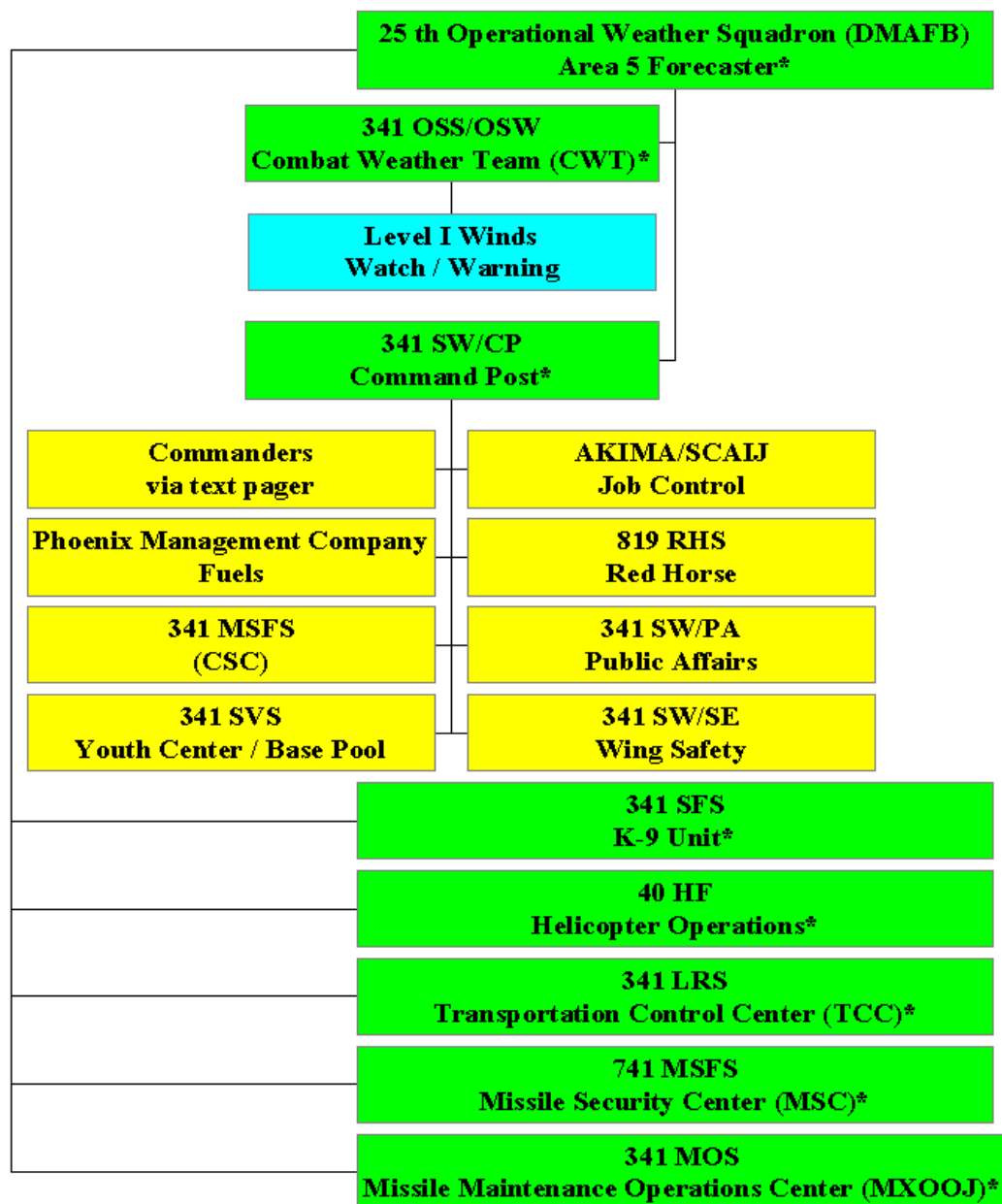
**OWS Duty Priority List****Table A2.2. 25 OWS DUTY PRIORITIES**

Priority	Duties
1	Perform Emergency War Order Tasks, and/or Support Combat, Contingency and Military Operations Other Than War (MOOTW)
2	Support Organizations During Aircraft/Ground Emergencies
3	Provide Airborne Aircrew Support
4	Provide Resource Protection Forecasts (Weather Watches, Warnings and Advisories)
5	Disseminate UUA Pilot Reports
6	Prepare and Disseminate TAFs, MOAFs and/or RCFs
7	Provide Scheduled Flight Weather MEFs
8	Provide Unscheduled Flight Weather MEFs
9	Prepare and Disseminate Forecast Graphics and Discussion Products
10	Provide All Other Weather Support

## Attachment 3

## WW, WATCH, AND WA PRIMARY DISSEMINATION SYSTEM

Via Advanced Meteorological Information System



Via Advanced Meteorological Information System

**NOTES:**

The 25th OWS will make a back-up call to 341 SW/CP on any OWS issued product. The CWT will make a back-up call to the following agencies on any CWT issued product: 341 SW/CP, 40HF and 741 MSFS. Commanders of units in need of weather information and not listed on this attachment are responsible for getting listed on command post notification lists.

\* Indicates agencies that have AMIS installed.

## Attachment 4

## WW, WATCH AND WA TEXT EXAMPLES

## WW, WATCH, and WA Text Examples

## WATCH Text Formats

**LEVEL I HIGH WIND WATCH  
FOR 10 MS, 12 MS, 490 MS, 564 MS, and/or MAFB**

**CONDITIONS ARE FAVORABLE FOR THE DEVELOPMENT OF  
WIND GUSTS OF > 35 KNOTS. A WARNING WILL BE ISSUED IF  
LEVEL I HIGH WIND CONDITIONS BECOME IMMINENT.**

## WW Text Formats.

## Level I High Wind Warning

**LEVEL I HIGH WIND WARNING  
FOR 10 MS, 12 MS, 490 MS, 564 MS, and/or MAFB**

**CONDITIONS ARE FAVORABLE FOR THE DEVELOPMENT OF  
WIND GUSTS OF  $\geq$  35 KNOTS. A WARNING WILL BE ISSUED IF  
LEVEL I HIGH WIND CONDITIONS BECOME IMMINENT.**

## Lightning Warning

**LIGHTNING WARNING  
FOR A-05**

**LIGHTNING IS OCCURRING WITHIN 5 SM OF A-05.**

## WA Text Formats (edit as deemed necessary).

## Ceiling/Visibility Advisory

**CEILING/VISIBILITY ADVISORY  
FOR: 10 MS**

**CEILINGS LESS THAN 700' AGL BUT GREATER THAN OR  
EQUAL TO 200' AGL AND/ OR VISIBILITIES LESS THAN 1 NM  
BUT GREATER THAN OR EQUAL TO  $\frac{1}{2}$  NM ARE OCCURRING AT  
10 MS.**

## Turbulence Advisory

**TURBULENCE ADVISORY  
FOR: 10 MS**

**TURBULENCE IN EXCESS OF MODERATE INTENSITY IS  
FORECASTED FOR 10 MS.**

## Icing Advisory

**ICING ADVISORY  
FOR: 10 MS**

**ICING OF LIGHT INTENSITY OR GREATER IS FORECASTED  
FOR 10 Ms.**

**Attachment 5****COMMUNICATION AND EQUIPMENT RESTORAL PRIORITIES****Ref: 341 CS OI 21-9**

EQUIPMENT/COMMUNICATIONS	RESTORAL PRIORITY
Base Weather UHF Radio (239.8)- PMSV	Outage – 2
	Impairment – 3
WSR-88D (NEXRAD) Weather Radar PUP	Outage – 1
	Impairment – 2
Automated Surface Observation System (ASOS)	Outage – 1
	Impairment – 3

Restoral PriorityNormal Response Times\*

Immediate (NLT 1 hr)

ASAP (NLT 24 hrs)

Next duty day

\*Notes:

1. Discrepancies turned over to civilian contractors will be responded to as per their contract.
2. May request quicker response times than outlined in this table and 341 CS OI 21-9. If mission requirements dictate this, submit a request through CCC NCOIC to the Mission Systems Flight Commander who will in turn make the final determination on restoral priority.